



## ACRYLIC COPOLYMER FAST DRY TRAFFIC MARKING PAINT MGS -97-01D

**1.0 DESCRIPTION.** These specifications cover ready-mixed white and yellow paint suitable for heated or cold application by conventional or airless spray to clean, dry concrete or bituminous pavement. The paint shall be capable of receiving and holding glass beads for producing reflectorized traffic markings. **Note: This traffic marking paint may be extremely fast drying and is suitable for long-line application throughout the striping season. Use of this paint for hand-applied marking may cause poor adherence of glass beads unless precautions are taken to apply glass beads prior to surface skinning of the applied paint film.**

**1.1** The attention of the bidder is specifically directed to the following requirements: **At the request of the purchaser, any paint furnished under this provision that has been contaminated with any form of material, cannot be satisfactorily applied, or that does not otherwise meet these specifications shall be disposed of by the supplier and immediately replaced with acceptable material entirely at the supplier's expense, including handling and transportation charges. Paint that has been delivered and is subsequently determined to fail to meet these specification requirements may be accepted for use by the purchaser after an appropriate deduction in purchase price as agreed to by the purchaser and supplier. It is to be expressly understood that these requirements are a part of the bid.**

**2.0 MATERIALS.** The paint shall contain no more than 3200 ppm lead and/or more than 800 ppm chromium based on dry weight and shall have limited Volatile Organic Content (VOC), as noted herein.

**2.1 Acrylic Resins.** The paint shall contain the correct ratio of MMA/NBMA [Poly(methyl methacrylate/N-butyl methacrylate/Methacrylic acid)] and isobutyl methacrylate-diethyl aminoethyl methacrylate copolymer binder resins.

**2.2 Solvent.** This paint is a solvent-based paint that shall meet all regulatory requirements for volatile organic compound (VOC) content. The VOC of the finished paint shall be less than 150 grams of volatile organic matter per Liter when tested in accordance with ASTM D 3960. Typically, the major solvent used in the manufacture of this paint is acetone, with lesser amounts of lower volatility solvents.

**2.1 GENERAL.** The finished paint shall be formulated and manufactured from first grade materials and shall be a fast drying, solvent based paint capable of withstanding air and roadway temperatures without bleeding, staining, discoloring, or deforming. The dried film shall be capable of maintaining its original dimensions and placement without chipping, spalling, or cracking. In addition, it shall not deteriorate because of contact with normal roadway chemicals.

**2.2 Durability Testing.** Determination of conformance to this specification will include, but will not be limited to, the evaluation of test data from AASHTO's National Transportation Product Evaluation Program (NTPEP) or other MoDOT approved facilities. The maintained retroreflectivity and durability shall conform to the following requirements after being installed on at least one NTPEP test deck for at minimum of six months. The six month data must include the winter months of December, January, and February and the data shall be obtained from evaluation on an NTPEP test deck in a northern, wet climate region.

**2.2.1 Maintained retroreflectivity.** Photometric quantity to be measured is coefficient of retroreflective luminance ( $R_L$ ) in accordance with the requirements of ASTM E1743 for 15 meter geometry and ASTM E1710 for 30 meter geometry. The average  $R_L$  for concrete and asphalt surfaces shall be expressed in millicandelas per square foot per footcandle and shall be at least 100 for 15 meter or 75 for 30 meter, when measured in the skip line or centerline areas.

**2.2.2 Durability.** Paint shall have a durability rating of at least 4 for both concrete and asphalt surfaces when tested in the wheel path area.

**2.5 Mixed Paint.** The mixed paint shall conform to the following requirements.

**2.5.2** The paint shall be strained before filling, using a screen not coarser than 40 mesh, or equivalent.

**2.5.4** The paint shall have the following physical properties:

**2.5.4.1 Physical Properties.**

Weight per Gallon, 77°F (25°C), lbs.	Report
Viscosity, 77°F (25°C), Krebs Units	80 - 95
Laboratory Dry Time, ASTM D 711, minutes, max.	10

**2.5.3.3 Color.** For white, the color shall closely match Color Chip 37925 of Federal Standard 595b and for yellow, the color shall closely match Color Chip 33538 of Federal Standard 595b.

Color determination will be made for markings and the diffuse daytime color of the markings shall conform to the below CIE Chromaticity coordinate limits. Color determination for liquid marking materials will be made over the black portion of a 2A or 5C Leneta Chart or equal at least 24 hours after application of a 15mil wet film. Color readings will be determined in accordance with the requirements of ASTM E1349 using CIE 1931 2 standard observer and CIE standard illuminant D65.

CIE CHROMATICITY COORDINATE LIMITS (INITIAL)								
Color	1		2		3		4	
	x	y	x	y	x	y	x	y
White	0.334	0.357	0.334	0.317	0.297	0.357	0.297	0.317
Yellow	0.531	0.483	0.531	0.429	0.471	0.483	0.471	0.429

**2.5.4.3 Contrast Ratio.** The minimum contrast ratio shall be 0.98 when drawn down as a 15 mil wet film on a 2A or 5C Leneta Chart, or equal, and air dried 24 hours. Contrast ratio = Black/White.

**2.5.4.4 Reflectance.** The daylight directional reflectance of the white paint shall not be less than 84% and not less than 50% for yellow paint of a 15 mil wet film applied to a 5C Leneta Chart or equal. After drying 24 hours, measure the reflectance of the paint over the black portion of the chart using a Hunterlab Labscan XE Colorimeter, ASTM E 1347.

**2.5.4.5 No-Tracking Time Field Test.** The paint shall dry to a no-tracking condition under traffic in three minutes maximum when applied at  $15 \pm 1$  mil wet film thickness at 110-125 F, and from three to ten minutes when applied at ambient temperatures, with 6 pounds of glass beads per gallon paint. "No tracking" shall be the time in minutes required for the line to withstand the running of a standard automobile over the line at a speed of approximately 40 mph, simulating a passing procedure without tracking of the reflectorized line when viewed from a distance of 50 feet.

**3.0 Prequalification of Bidder.** No bid will be considered unless the firm submitting the bid can meet the following conditions:

**3.1** That it has in operation a plant adequate for, and devoted to manufacture of the pavement marking paint that it proposes to furnish, and is capable of producing batch sizes consistent with the quantities to be delivered.

**3.2** That it maintains a laboratory to scientifically control the product bid upon to assure accuracy and quality of formulation.

**3.3** That it has produced fast drying solvent borne traffic marking paint over the past year (1) with a successful application record.

**3.4** That the product(s) bid upon have successfully completed the durability testing required under Section 2.2 of this specification.

#### **4.0 Prequalification of Paint.**

**4.1** Prior to bid opening each bidder shall submit a three quart sample of each paint bid upon. Each paint sample shall be accompanied by certified test results for all of the tests stipulated under Section 2.5 of this specification. Each sample shall be identified by manufacturer's code number and type of paint to permit easy reference and identification. Samples are to be submitted to the Chemical Laboratory Director, Missouri Department of Transportation, Materials Laboratory, 1617 Missouri Boulevard, Jefferson City, MO 65109.

**4.2** Each bidder shall submit documentation indicating the most recent NTPEP report that provides the data required under Section 2.3 of this specification. The bidder shall also submit certification that the paint offered for conformance to this specification is manufactured to the same formulation as the paint applied on the test deck. The manufacturer's identification code for the submitted paint shall be the same as that submitted for application to the test decks and that is shown on the appropriate NTPTP report.

**4.3** No award of bids will be made until the paint has met all the requirements specified herein when subjected to testing in the Department's Laboratory.

**5.0 Service.** Since proper application is deemed essential to the success of this process, the manufacturer shall have at least one technician available to instruct in the application of this type of paint. The technicians shall be familiar with the application equipment and materials, and shall have successful experience in the placing of fast drying traffic paint.

#### **6.0 Acceptance.**

**6.1** The paint shall be homogeneous, well ground, shall not settle badly or cake in the container, and shall readily break up with a paddle to a smooth uniform consistency. It shall be

free from water, dirt, and other foreign matter and shall dry within the specified period to a good, tough serviceable film.

**6.2** The paint shall be capable of outdoor storage in unopened drums or other bulk storage tanks for at least 15 months. Any paint which has livered or in any way hardened or thickened in the container, or in which the pigment has settled out so that it cannot be remixed by hand and mechanical mixing to a smooth uniform suspension of useable consistency shall be disposed of by the supplier and immediately replaced with acceptable material entirely at the supplier's expense, including and transportation charges.

**7.0 Purchasing.** The ready-mixed paint shall be purchased by volume, one (1) gallon shall mean two hundred thirty-one (231) cubic inches at twenty-five (25) degrees Centigrade.

**8.0 Inspection.** The successful vendor shall notify the Chemical Laboratory Director, Missouri Department of Transportation , P.O. Box 270, Jefferson City, MO 65102 prior to start of manufacture of any paint. Should the vendor's production facility be outside of the State of Missouri, the department reserves the right to take into consideration, in determining the low bidder, the added cost of inspection at such point compared to inspection performed within the state.

**8.2** The manufacturer shall provide, at no additional cost, standard frictionseal quart cans for sampling of the finished product.

**8.3** Manufacture of the paint may be witnessed in whole or part, at the discretion of the Chemical Laboratory Director. The manufacturer shall accord the inspector free access to those parts of the manufacturing facility wherein the products are being manufactured or raw materials are being stored or finished products being tested, and in all other ways shall facilitate the inspector in performing his duties

**8.4 Basis for Rejection.** Finished products which fail to meet any requirement of the specifications shall be subject to rejection.